

FERGUS

***water pollution
control plant***

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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET, TORONTO 5
OFFICE OF THE GENERAL MANAGER

Members of the Fergus Local Advisory Committee,
Town of Fergus.

Gentlemen:

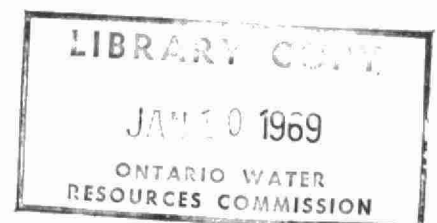
We are happy to present you with the 1967 Operating Summary for the
Fergus Water Pollution Control Plant, OWRC Project No. 2-0023-58.

Your co-operation with our staff throughout the year has been appreciated.
Only with such co-operation can the war against water pollution be waged
effectively.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,
General Manager.



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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

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CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

TELEPHONE 365-

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Fergus
Water Pollution Control Plant, OWRC Project No. 2-0023-58.

The summary reviews progress during the year, outlines operating prob-
lems encountered and summarizes in graphs, charts and tables all sig-
nificant flow and cost data.

Yours very truly,

A handwritten signature in cursive script, reading "D. A. McTavish".

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

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FERGUS
water pollution control plant

operated for

THE TOWN OF FERGUS

by the

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'67 **REVIEW**

A total of 258,032 million gallons of sewage was treated at the Fergus Water Pollution Control Plant during the year at a total operating cost of \$20,388.07. The 1966 operating cost was \$20,582.17. However, the average raw sewage BOD in 1966 was 250 ppm as compared to an average raw sewage BOD in 1967 of 148 ppm. The large reduction in raw sewage BOD compared with almost equal operating costs resulted in an increase in the cost per lb. of BOD removed from \$0.04 in 1966 to \$0.06 in 1967.

The average daily flow recorded at the plant was 0.707 million gallons. Flows in excess of one million gallons per day are by-passed to the chlorine contact chamber before reaching the plant flow meter. The plant design flow of 0.6 mgd was exceeded 58 percent of the time as compared to 43 percent of the time in 1966.

The raw sewage BOD concentration averaging 148 ppm exceeded the design value of 200 ppm, 30 percent of the time. The raw sewage suspended solids concentration averaging 186 ppm exceeded the design value of 200 ppm, 38 percent of the time. The final effluent BOD and suspended solids concentrations exceeded the OWRC objective of 15 ppm for each, 13 percent and 24 percent of the time respectively. The average BOD and suspended solids reduction efficiencies were 92.1 percent and 85.7 percent respectively.

During the year, both the Elora and Fergus WPCPs were operated by the plant staff stationed at the Fergus WPCP. Under the supervision of head office engineers the plant staff operated a clean, attractive and efficient plant for the Town of Fergus.

PROJECT COSTS

NET CAPITAL COST (Estimated)	
Long Term Debt to OWRC	<u>\$277,393.48</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	<u>\$ 86,557.38</u>
Debt Retirement	\$ 10,064.00
Reserve	1,750.19
Interest Charged	15,643.17
Net Operating	20,388.07
	<hr/>
TOTAL	<u>\$ 47,845.43</u>

RESERVE ACCOUNT

Balance at January 1, 1967	\$ 8,209.93
Deposited by Municipality	1,750.19
Interest Earned	<u>502.58</u>
	\$ 10,462.70
Less Expenditures	<u>(62.11)</u>
Balance at December 31, 1967	<u>\$ 10,400.59</u>

MONTHLY OPERATING COSTS

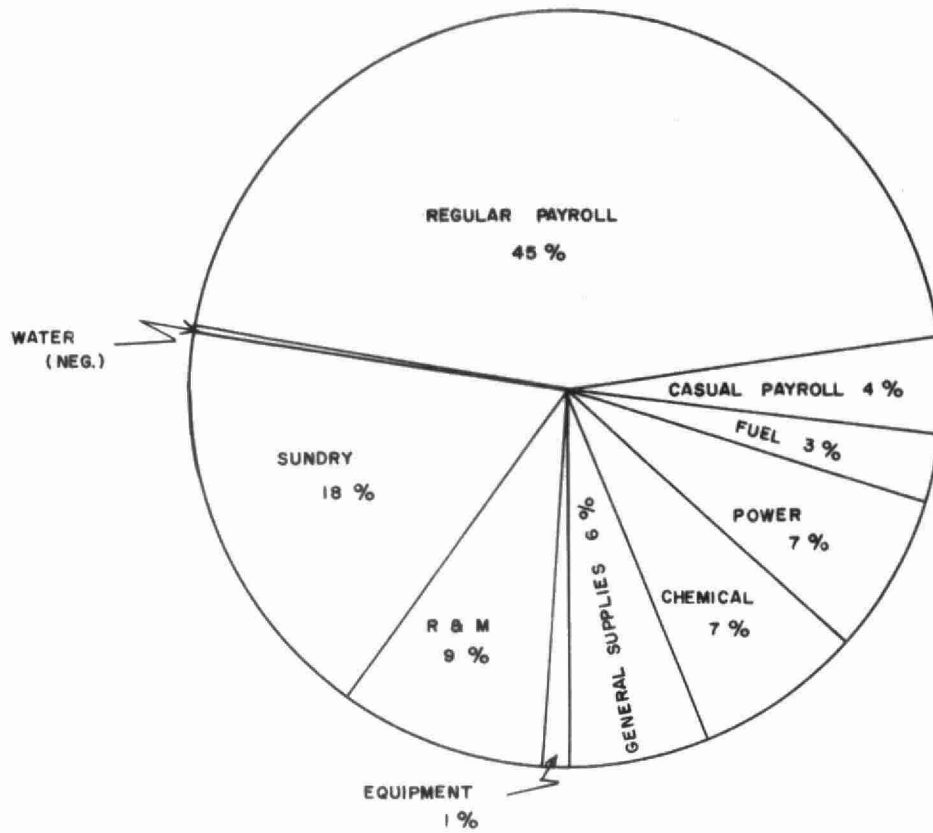
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	1148.37	840.40		98.55	120.37		8.12	58.17	13.69		9.07
FEB	1107.86	570.79			124.83	228.38	47.87	51.71	61.32	22.96	
MARCH	1860.64	1215.51		64.82	124.83		58.11		334.22	63.15	
APRIL	1178.00	762.88		83.22	127.83		113.47		3.13	82.37	8.10
MAY	1558.24	775.62		100.74	128.11	228.38	165.97		44.30	115.12	
JUNE	2293.27	608.49	116.76		101.79	228.38	70.36		710.98	456.51	
JULY	1924.38	621.19	276.42		111.46		62.73	127.15	61.60	654.73	9.07
AUG	1423.44	611.50	145.88		118.30	228.38	174.82		56.90	87.66	
SEPT	2346.06	1213.45	295.97		113.85		67.56		20.19	635.04	
OCT	1294.95	733.20			132.99	114.19	52.94			261.63	
NOV	1546.89	548.52		99.10	120.37	102.90	134.27		95.20	446.53	
DEC	2705.95	675.19		102.87	118.30	342.57	241.70		400.39	824.95	
TOTAL	20388.07	9176.74	835.03	549.30	1440.03	1473.18	1197.92	237.03	1801.92	3650.68	26.24

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$2,912.32

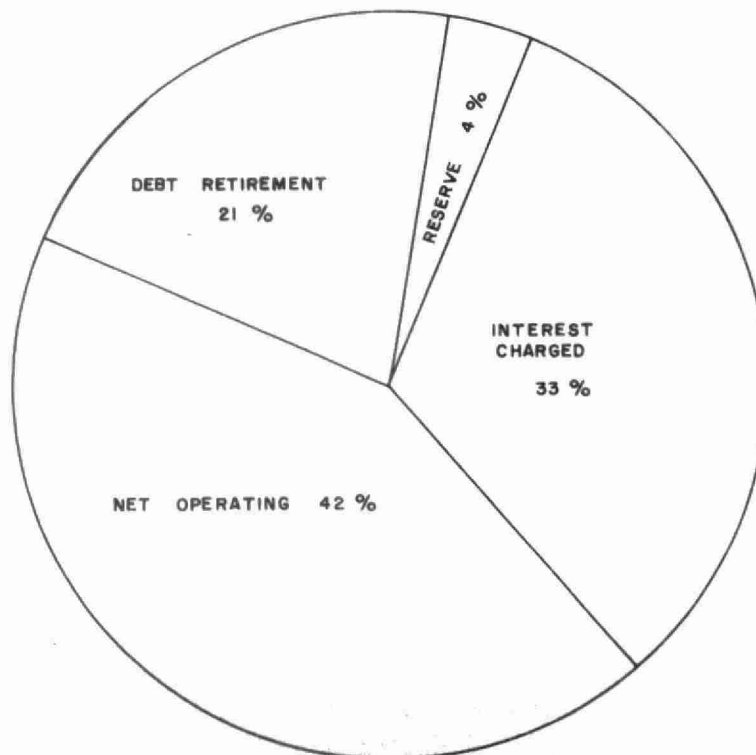
YEARLY OPERATING COSTS

YEAR	M. G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1961	118.82	\$11201.00	\$ 94.25	6 CENTS
1962	106.77	12021.00	112.50	4 CENTS
1963	143.12	12730.66	88.83	5 CENTS
1964	180.12	19881.89	110.37	4 CENTS
1965	208.34	21760.15	104.45	3 CENTS
1966	219.048	20582.17	93.96	4 CENTS
1967	258.032	20388.07	79.01	6 CENTS

1967 OPERATING COSTS



TOTAL ANNUAL COST



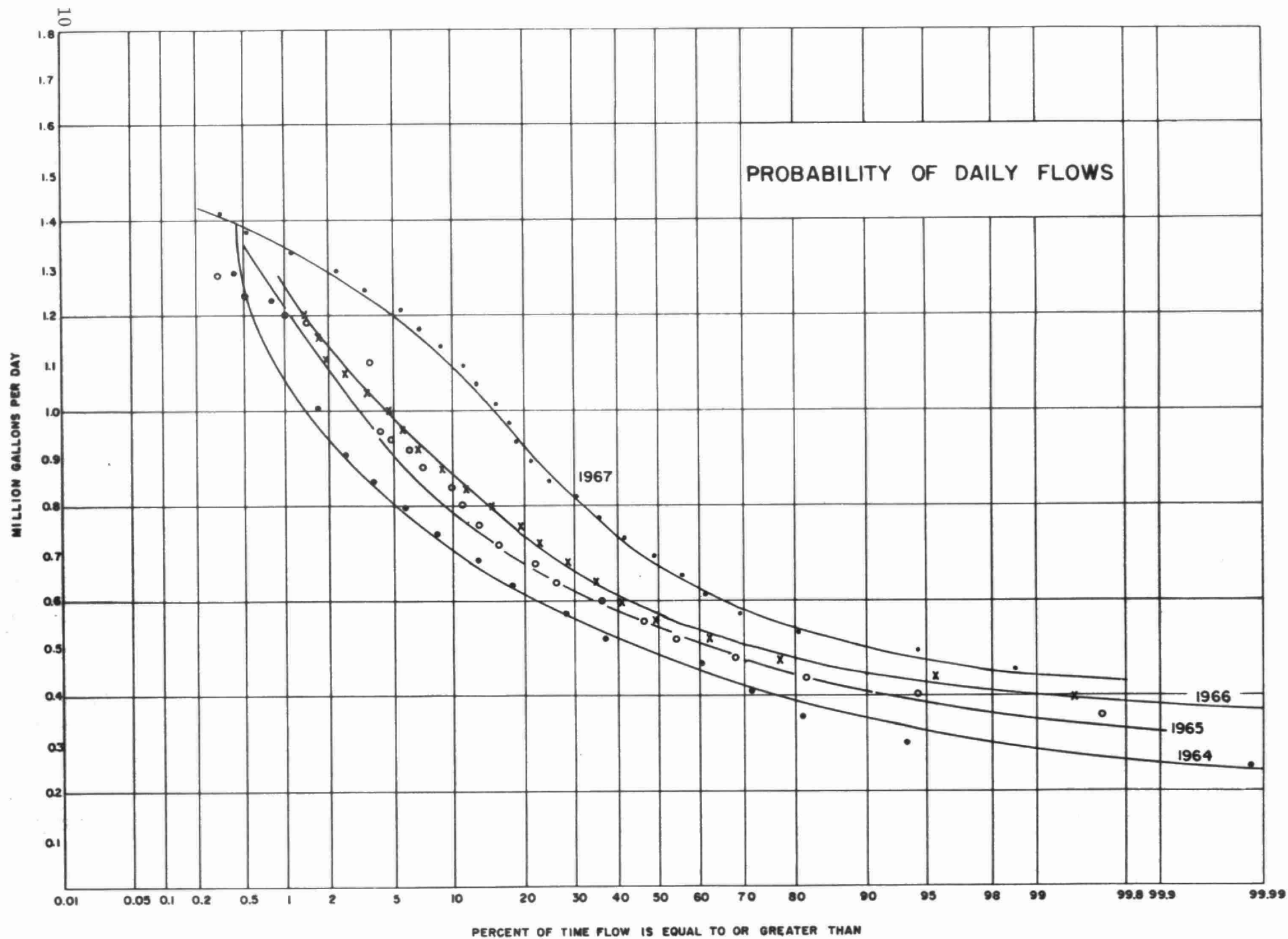
Process Data

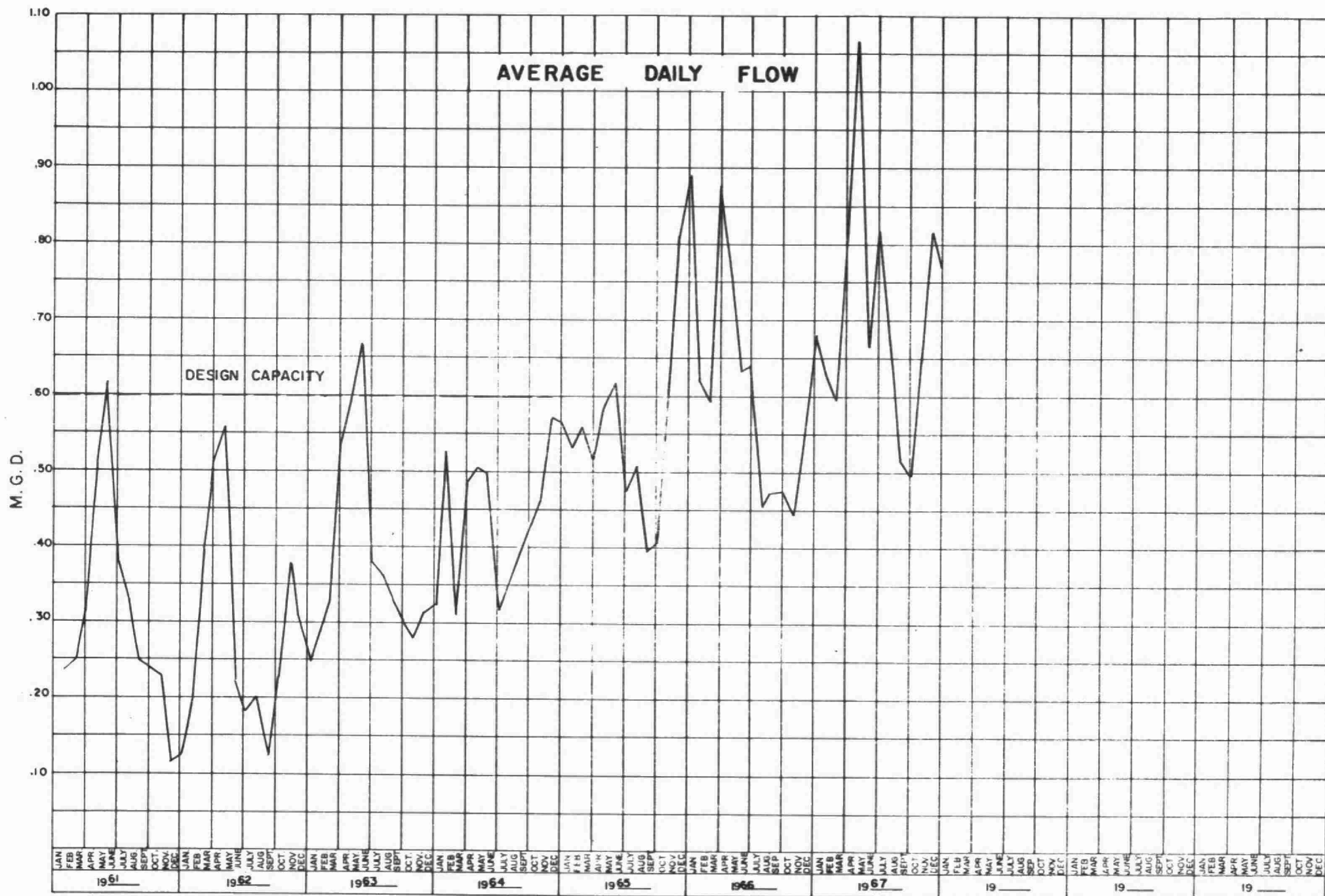
The average flow for 1967 was 0.707 mgd. This represents 118 percent of the design flow of 0.600 mgd. The average flow in 1966 equalled the design average. The average daily flow, therefore, increased by 18 percent during 1967.

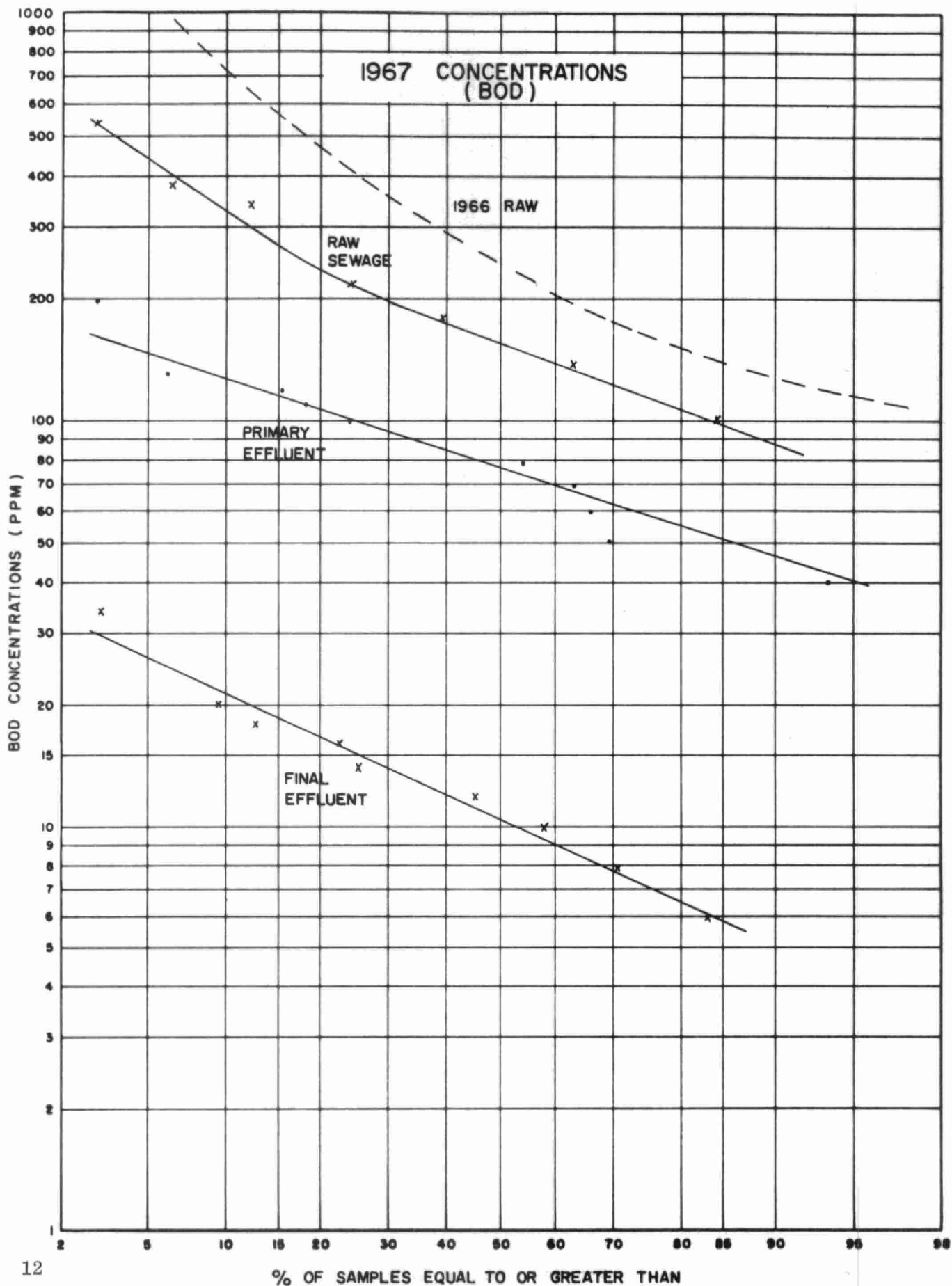
During the past year, 258.032 million gallons of raw sewage, composed of both domestic and industrial wastes, received complete treatment.

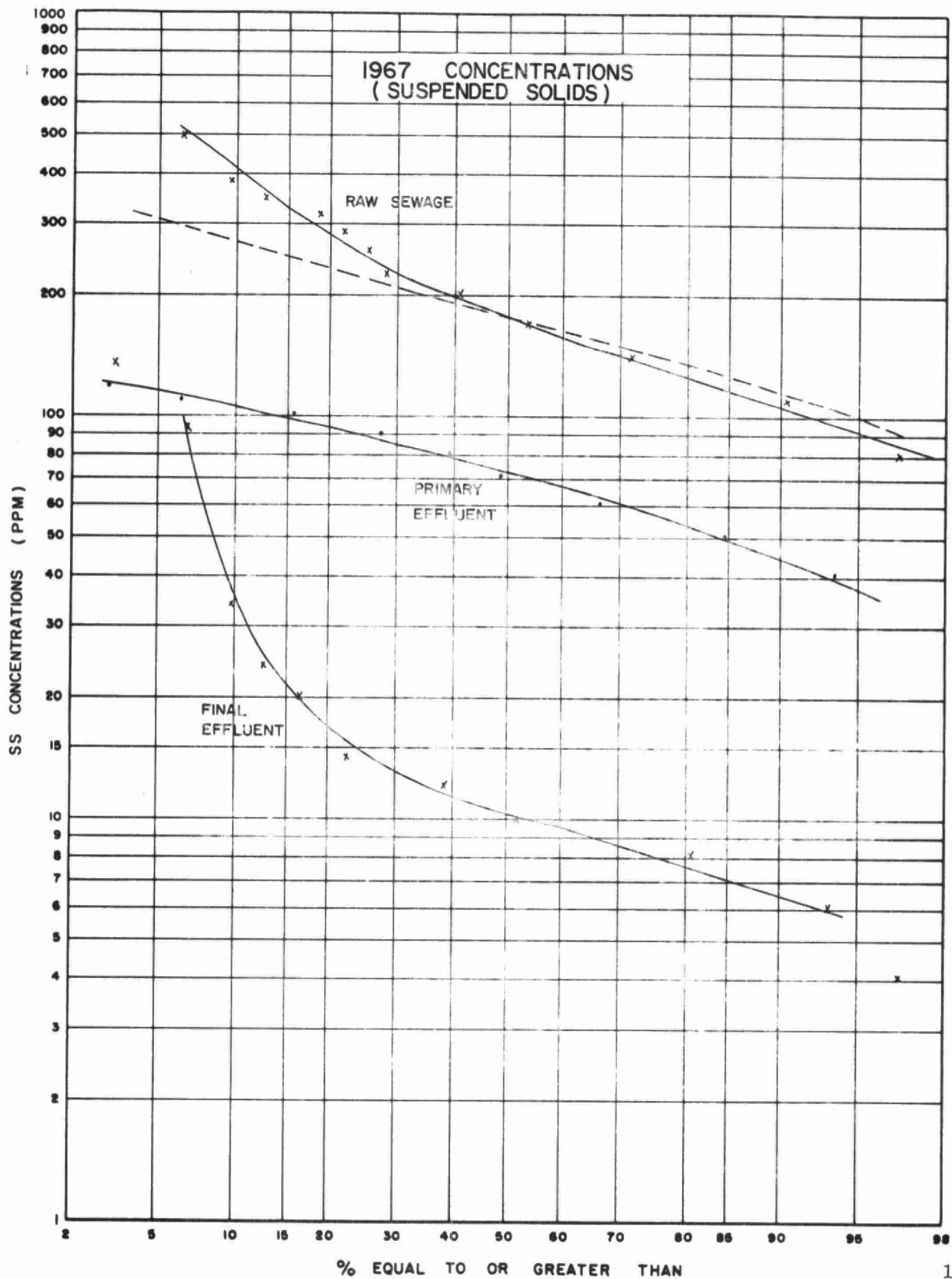
The highest monthly average was 1.07 mgd and occurred in April. The design flow of .600 mgd was exceeded on a monthly basis every month except February, August and September.

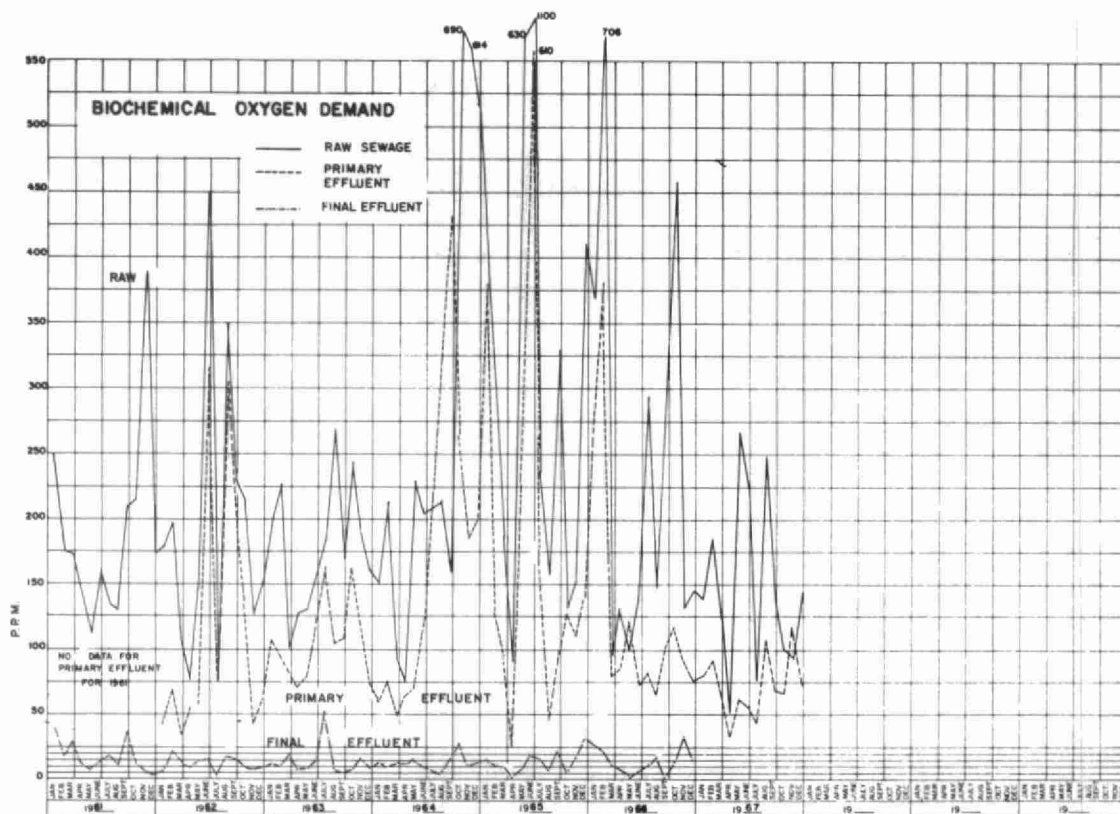
The design daily flow was exceeded 68 percent of the time. In 1966, it was exceeded 43 percent of the time.



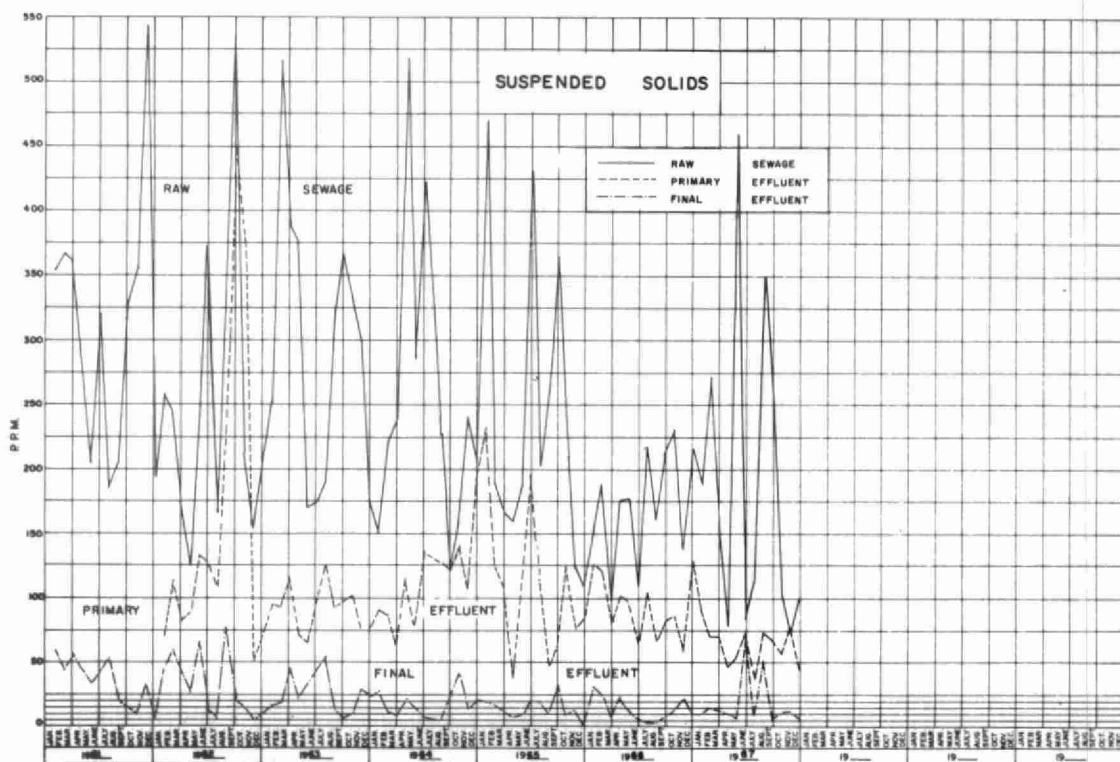








MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

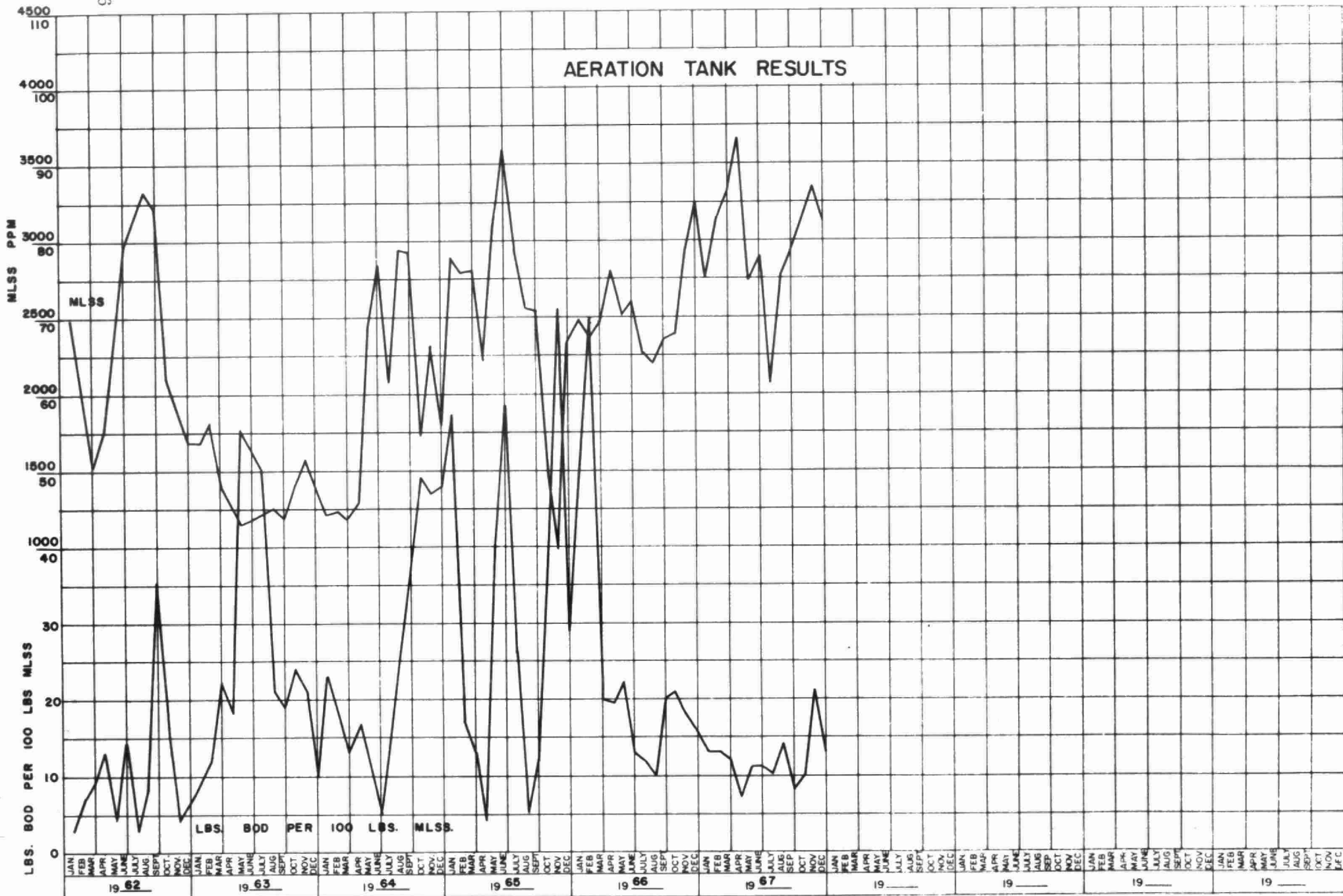
MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	139	16.0	88.5	12.01	189	10	94.7	17.48	23
FEB.	185	12.0	93.5	14.41	272	14	94.8	21.49	14
MAR.	123	4.9	96.0	7.60	151	13	91.4	7.20	18
APR.	50	4.4	91.2	7.28	79	11	86.1	10.96	60.5
MAY	266	9.2	96.5	26.51	460	7	98.5	46.77	13
JUNE	224	2.2	90.2	24.74	85	67	21.2	2.20	23
JULY	74	6.2	91.6	7.09	114	8	93.0	11.09	28
AUG.	246	13.0	94.7	18.51	349	51	85.4	23.67	25.5
SEPT.	136	11.8	91.3	9.22	254	6	97.6	18.43	14.5
OCT.	99	12.8	87.1	8.66	103	11	89.3	9.24	47.5
NOV.	93	8.7	90.6	10.32	73	12	83.6	7.46	17
DEC.	140	9.0	93.6	15.49	100	7	93.0	11.00	12.5
TOTAL	-	-	-	161.84	-	-	-	186.89	296.5
AVG.	148	10.8	92.1	13.49	186	18	85.7	15.57	24.7

COMMENTS

The average raw sewage BOD of 148 ppm was 74 percent of the design concentration of 200 ppm. The raw sewage suspended solids of 186 ppm was 93 percent of the design value of 200 ppm. The average effluent BOD concentration was 10.8 ppm, which was below the OWRC objective of 15 ppm. The average effluent suspended solids concentration was 18 ppm which exceeded the OWRC objective of 15 ppm. It should be noted however that with the exception of the months of June and August, the suspended solids concentration in the effluent was below the OWRC objective.

The plant reduced the BOD and suspended solids on an average of 92.1 and 85.7 percent respectively.

AERATION TANK RESULTS



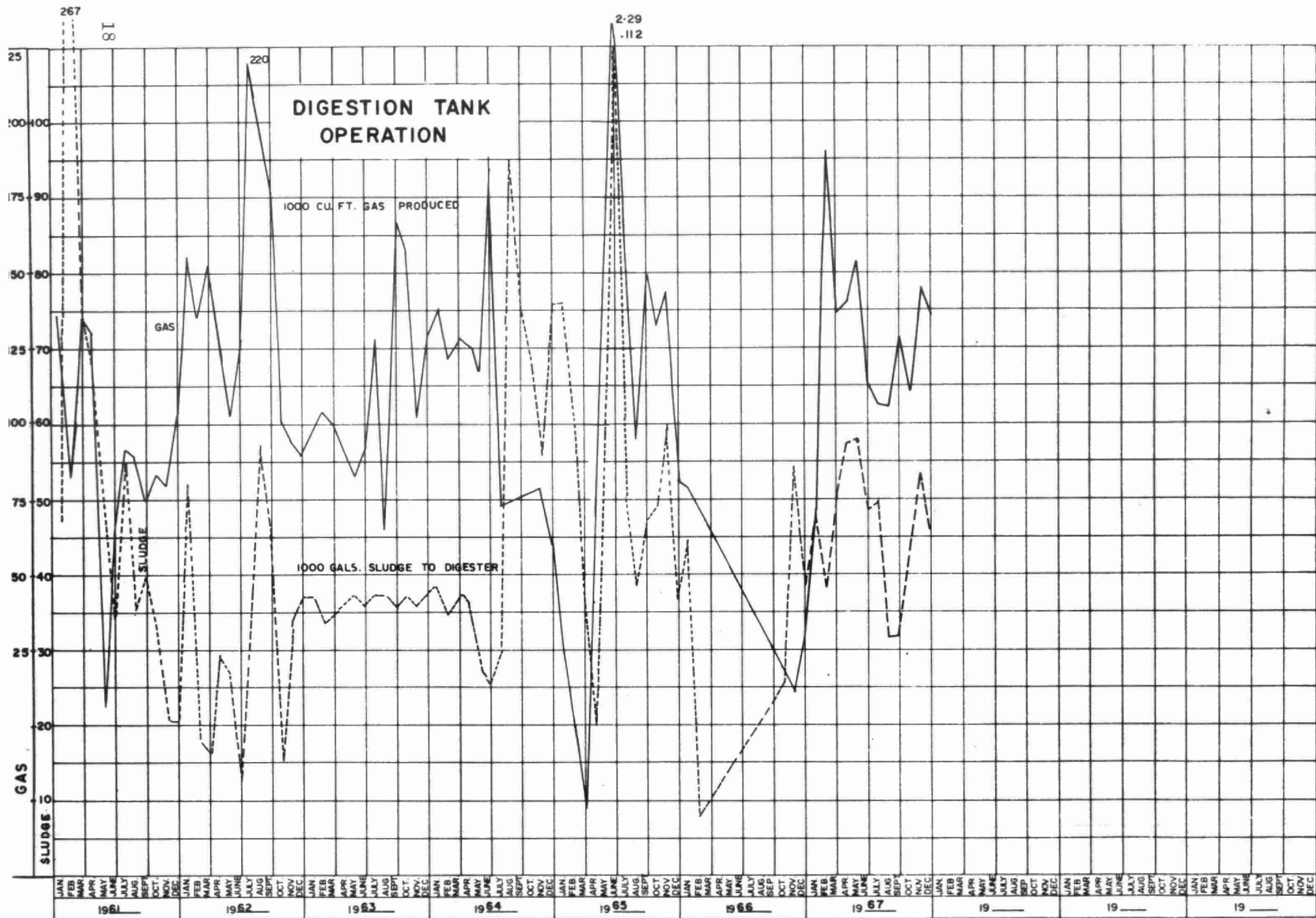
AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	79	2743	13
FEBRUARY	91	3139	13
MARCH	66	3314	12
APRIL	33	3666	7
MAY	61	2741	11
JUNE	56	2907	11
JULY	43	2080	10
AUGUST	107	2773	14
SEPTEMBER	68	2942	8
OCTOBER	66	3137	10
NOVEMBER	117	3353	21
DECEMBER	73	3117	13
TOTAL	-	-	-
AVERAGE	72	2993	12

COMMENTS

The average MLSS concentration was 2,993 ppm. Combining the average MLSS concentration with an average primary effluent BOD of 72 ppm, the average loading on the aeration section was 12 lbs. of BOD per 100 lbs. of MLSS.

The mechanical aerators supplied sufficient oxygen to provide good treatment during the year.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	GALLONS	% SOLIDS	% VOL. MAT	GALLONS	% SOLIDS	% VOL. MAT	
JAN.	48420	4.77	70.44	-	2.11	57.85	72.184
FEB.	38162	3.95	73.41	-	2.71	50.18	188.930
MAR.	50474	-	-	6571	-	-	137.131
APR.	57107	5.13	35.09	15163	5.59	34.17	141.968
MAY	58015	-	-	69498	-	-	154.544
JUNE	48670	-	-	78343	-	-	114.512
JULY	49645	3.26	46.93	63179	3.12	35.58	107.158
AUG.	31670	-	-	30326	-	-	106.100
SEPT.	31885	7.10	61.00	32853	2.50	45.00	128.768
OCT.	43475	5.05	65.72	51808	3.55	41.43	111.175
NOV.	53278	5.20	69.00	43017	-	-	144.991
DEC.	45857	6.80	61.00	50544	-	-	136.415
TOTAL	556558	-	-	446302	-	-	1534.876
AVG.	46380	5.17	60.32	44630	3.26	44.04	128.656

COMMENTS

An average of 46,380 gallons of sludge per month was pumped to the digester. The sludge contained an average of 5.17 percent total solids of which 60.32 percent was volatile matter. Sludge pumped from the digester contained an average of 3.26 percent total solids of which 42.24 percent was volatile matter. The average reduction in volatile matter was 52 percent. This compares favourably with existing comparative criteria for digester operation.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	19.529	639	3.27
FEBRUARY	16.661	757	4.54
MARCH	24.861	786	3.16
APRIL	31.950	801	2.51
MAY	20.648	850	4.11
JUNE	24.491	846	3.45
JULY	20.920	867	4.14
AUGUST	15.888	742	4.67
SEPTEMBER	14.860	839	5.65
OCTOBER	20.098	781	3.89
NOVEMBER	24.476	712	2.91
DECEMBER	23.650	697	2.94
TOTAL	258.032	9317	-
AVERAGE	21.502	776	3.77

COMMENTS

Chlorination of the plant effluent was practiced year-round. An average dosage of 3.77 ppm was sufficient to maintain a chlorine residual of 0.5 ppm.



CONCLUSIONS

The average hydraulic loading of 0.707 mgd exceeded the design flow of 0.600 mgd by 18 percent. Both the average raw sewage BOD and suspended solids concentrations were below the design values. The average BOD and suspended solids reduction efficiencies were 92.1 percent and 85.7 percent respectively producing an effluent with average BOD and suspended solids concentrations of 10.8 ppm and 18 ppm respectively.

The present arrangement utilizing the OWRC staff at the Fergus Water Pollution Control Plant to operate both the Fergus and Elora Water Pollution Control Plants proved successful and economical during the year.

The average BOD concentration in a normal raw sewage is in the order of 200 ppm. The average raw sewage BOD concentration of 148 ppm suggests that infiltration is a problem in the municipal sewerage system and is diluting the raw sewage prior to arrival at the water pollution control plant.

RECOMMENDATIONS

As the water pollution control plant has exceeded its hydraulic design loading, expansion proceedings should be continued.

In order to reduce the hydraulic loading, on the plant, the municipality should take all necessary steps to reduce ground water infiltration in the sewerage system.

The present arrangements in staffing both the Elora and Fergus WPCPs should be continued.

